

1 **WHAT IS CLAIMED IS:**

- 2 1. A method for reducing the carbon monoxide content of a hydrogen rich gas,
3 comprising:
4 providing a reactor having a catalyst bed containing an oxidation catalyst;
5 distributing an oxygen-containing stream throughout the catalyst bed in the
6 presence of the hydrogen rich gas and the oxidation catalyst bed;
7 maintaining the reactor operating temperature in a desired range.
- 8 2. The method of claim 1, wherein the reactor has a porous tube substantially
9 positioned within the catalyst bed for distributing the oxygen-containing stream
10 throughout the catalyst bed.
- 11 3. The method of claim 2, wherein the oxygen-containing stream is maintained at a
12 higher pressure than the hydrogen rich gas.
- 13 4. The method of claim 1, wherein the desired range for the reactor operating
14 temperature minimizes the oxidation of hydrogen.
- 15 5. The method of claim 1, wherein the desired range for the reactor operating
16 temperature is from about 90°C to about 180°C.
- 17 6. The method of claim 1, wherein the desired range for the reactor operating
18 temperature is from about 90°C to about 150°C.
- 19 7. The method of claim 1, wherein the reactor has a cooling jacket for maintaining
20 the reactor operating temperature.
- 21 8. The method of claim 7, wherein the cooling jacket contains a circulating coolant
22 selected from the group consisting of water, steam, air, and hydrocarbon fuel.

- 1 9. An apparatus for selectively reducing the carbon monoxide content of a hydrogen
2 rich gas, comprising:
3 a catalyst bed containing an oxidation catalyst;
4 a porous tube positioned substantially within the catalyst bed for distributing an
5 oxygen-containing stream throughout the catalyst bed; and
6 a cooling jacket for maintaining the reactor operating temperature in a desired
7 range.
- 8 10. The apparatus of claim 9, wherein the porous tube is a sintered stainless steel
9 tube.
- 10 11. The apparatus of claim 9, wherein the porous tube is an alumina tube.
- 11 12. The apparatus of claim 9, wherein the porous tube is substantially positioned
12 along the catalyst bed length.
- 13 13. The apparatus of claim 9, wherein the desired range for the reactor operating
14 temperature is from about 90°C to about 180°C.
- 15 14. The apparatus of claim 9, wherein the desired range for the reactor operating
16 temperature is from about 90°C to about 150°C.
- 17 15. The apparatus of claim 9, wherein the cooling jacket contains a circulating
18 coolant selected from the group consisting of water, steam, air, and hydrocarbon
19 fuel.
- 20 16. A reactor module for use in a compact fuel processor for selectively reducing the
21 carbon monoxide content of a hydrogen rich gas, comprising:
22 a catalyst bed containing an oxidation catalyst;

- 1 a porous tube positioned substantially within the catalyst bed along the catalyst
- 2 bed length for distributing an oxygen-containing stream throughout the
- 3 catalyst bed; and
- 4 a cooling jacket surrounding the catalyst bed for maintaining the reactor operating
- 5 temperature in a desired range.
- 6 17. The reactor of claim 16, wherein the porous tube is a sintered stainless steel tube.
- 7 18. The reactor of claim 16, wherein the porous tube is an alumina tube.
- 8 19. The reactor of claim 16, wherein the desired range for the reactor operating
- 9 temperature is from about 90°C to about 180°C.
- 10 20. The reactor of claim 16, wherein the desired range for the reactor operating
- 11 temperature is from about 90°C to about 150°C.
- 12 21. The reactor of claim 16, wherein the cooling jacket contains a circulating coolant
- 13 selected from the group consisting of water, air, and hydrocarbon fuel.